



SEQUENCE LISTING

<110> Japan Science and Technology Corporation

<120> Amino Acid Transporter And Gene Thereof

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gcc gag gag aag gaa gag gcg cgg gag aag atg ctg gcc gcc aag agc 158
Ala Glu Glu Lys Glu Glu Ala Arg Glu Lys Met Leu Ala Ala Lys Ser
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gcg gac ggc tcg gcg ccg gca ggc gag ggc gag ggc gtg acc ctg cag 206
Ala Asp Gly Ser Ala Pro Ala Gly Glu Gly Glu Gly Val Thr Leu Gln
35 40 45

cgg aac atc acg ctg ctc aac ggc gtg gcc atc atc gtg ggg acc att 254
Arg Asn Ile Thr Leu Leu Asn Gly Val Ala Ile Ile Val Gly Thr Ile
50 55 60

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Ile Gly Ser Gly Ile Phe Val Thr Pro Thr Gly Val Leu Lys Glu Ala
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Gly Ser Pro Gly Leu Ala Leu Val Val Trp Ala Ala Cys Gly Val Phe

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tcc atc gtg ggc gcg ctc tgc tac gcg gag ctc ggc acc acc atc tcc				398
Ser Ile Val Gly Ala Leu Cys Tyr Ala Glu Leu Gly Thr Thr Ile Ser				
	100	105	110	
aaa tcg ggc ggc gac tac gcc tac atg ctg gag gtc tac ggc tcg ctg				446
Lys Ser Gly Gly Asp Tyr Ala Tyr Met Leu Glu Val Tyr Gly Ser Leu		120	125	
	115			
ccc gcc ttc ctc aag ctc tgg atc gag ctg ctc atc atc cgg cct tca				494
Pro Ala Phe Leu Lys Leu Trp Ile Glu Leu Leu Ile Ile Arg Pro Ser		135	140	
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tcg cag tac atc gtg gcc ctg gtc ttc gcc acc tac ctg ctc aag ccg				542
Ser Gln Tyr Ile Val Ala Leu Val Phe Ala Thr Tyr Leu Leu Lys Pro		150	155	
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ctc ttc ccc acc tgc ccg gtg ccc gag gag gca gcc aag ctc gtg gcc				590
Leu Phe Pro Thr Cys Pro Val Pro Glu Glu Ala Ala Lys Leu Val Ala		170	175	
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Cys Leu Cys Val Leu Leu Leu Thr Ala Val Asn Cys Tyr Ser Val Lys		185	190	
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gcc gcc acc cgg gtc cag gat gcc ttt gcc gcc gcc aag ctc ctg gcc				686
Ala Ala Thr Arg Val Gln Asp Ala Phe Ala Ala Ala Lys Leu Leu Ala		200	205	
	195			
ctg gcc ctg atc atc ctg ctg ggc ttc gtc cag atc ggg aag ggt gat				734
Leu Ala Leu Ile Ile Leu Leu Gly Phe Val Gln Ile Gly Lys Gly Asp		215	220	
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gtg tcc aat cta gat ccc aac ttc tca ttt gaa ggc acc aaa ctg gat				782
Val Ser Asn Leu Asp Pro Asn Phe Ser Phe Glu Gly Thr Lys Leu Asp		230	235	
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gtg ggg aac att gtg ctg gca tta tac agc ggc ctc ttt gcc tat gga				830
Val Gly Asn Ile Val Leu Ala Leu Tyr Ser Gly Leu Phe Ala Tyr Gly		250	255	
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Gly Trp Asn Tyr Leu Asn Phe Val Thr Glu Glu Met Ile Asn Pro Tyr		265	270	
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aga aac ctg ccc ctg gcc atc atc atc tcc ctg ccc atc gtg acg ctg				926
Arg Asn Leu Pro Leu Ala Ile Ile Ile Ser Leu Pro Ile Val Thr Leu		280	285	
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Val Tyr Val Leu Thr Asn Leu Ala Tyr Phe Thr Thr Leu Ser Thr Glu		295	300	
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Gln Met Leu Ser Ser Glu Ala Val Ala Val Asp Phe Gly Asn Tyr His		310	315	
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 355 360

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Asp	Gly	Ser	Ala	Pro	Ala	Gly	Glu	Gly	Glu	Gly	Val	Thr	Leu	Gln	Arg
		35					40					45			
Asn	Ile	Thr	Leu	Leu	Asn	Gly	Val	Ala	Ile	Ile	Val	Gly	Thr	Ile	Ile
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Gly	Ser	Gly	Ile	Phe	Val	Thr	Pro	Thr	Gly	Val	Leu	Lys	Glu	Ala	Gly
65					70					75					80
Ser	Pro	Gly	Leu	Ala	Leu	Val	Val	Trp	Ala	Ala	Cys	Gly	Val	Phe	Ser
			85						90					95	

Ile	Val	Gly	Ala	Leu	Cys	Tyr	Ala	Glu	Leu	Gly	Thr	Thr	Ile	Ser	Lys	100	105	110
Ser	Gly	Gly	Asp	Tyr	Ala	Tyr	Met	Leu	Glu	Val	Tyr	Gly	Ser	Leu	Pro	115	120	125
Ala	Phe	Leu	Lys	Leu	Trp	Ile	Glu	Leu	Leu	Ile	Ile	Arg	Pro	Ser	Ser	130	135	140
Gln	Tyr	Ile	Val	Ala	Leu	Val	Phe	Ala	Thr	Tyr	Leu	Leu	Lys	Pro	Leu	145	150	155
Phe	Pro	Thr	Cys	Pro	Val	Pro	Glu	Glu	Ala	Ala	Lys	Leu	Val	Ala	Cys	165	170	175
Leu	Cys	Val	Leu	Leu	Leu	Thr	Ala	Val	Asn	Cys	Tyr	Ser	Val	Lys	Ala	180	185	190
Ala	Thr	Arg	Val	Gln	Asp	Ala	Phe	Ala	Ala	Ala	Lys	Leu	Leu	Ala	Leu	195	200	205
Ala	Leu	Ile	Ile	Leu	Leu	Gly	Phe	Val	Gln	Ile	Gly	Lys	Gly	Asp	Val	210	215	220
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Asn	Leu	Pro	Leu	Ala	Ile	Ile	Ile	Ser	Leu	Pro	Ile	Val	Thr	Leu	Val	275	280	285
Tyr	Val	Leu	Thr	Asn	Leu	Ala	Tyr	Phe	Thr	Thr	Leu	Ser	Thr	Glu	Gln	290	295	300
Met	Leu	Ser	Ser	Glu	Ala	Val	Ala	Val	Asp	Phe	Gly	Asn	Tyr	His	Leu	305	310	315
Gly	Val	Met	Ser	Trp	Ile	Ile	Pro	Val	Phe	Val	Gly	Leu	Ser	Cys	Phe	325	330	335
Gly	Ser	Val	Asn	Gly	Ser	Leu	Phe	Thr	Ser	Ser	Arg	Leu	Phe	Phe	Val	340	345	350
Gly	Ser	Arg	Glu	Gly	His	Leu	Pro	Ser	Ile	Leu	Ser	Met	Ile	His	Pro	355	360	365
Gln	Leu	Leu	Thr	Pro	Val	Pro	Ser	Leu	Val	Phe	Thr	Cys	Val	Met	Thr	370	375	380
Leu	Leu	Tyr	Ala	Phe	Ser	Lys	Asp	Ile	Phe	Ser	Val	Ile	Asn	Phe	Phe	385	390	395

Ser Phe Phe Asn Trp Leu Cys Val Ala Leu Ala Ile Ile Gly Met Ile
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 420 425 430
 Leu Ala Leu Pro Val Phe Phe Ile Leu Ala Cys Leu Phe Leu Ile Ala
 435 440 445
 Val Ser Phe Trp Lys Thr Pro Val Glu Cys Gly Ile Gly Phe Thr Ile
 450 455 460
 Ile Leu Ser Gly Leu Pro Val Tyr Phe Phe Gly Val Trp Trp Lys Asn
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 Met Ala Val Ala Gly Ala Lys Arg Arg Ala Val Ala Ala Pro Ala
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 Thr Thr Ala Ala Glu Glu Glu Arg Gln Ala Arg Glu Lys Met Leu Glu
 20 25 30

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 Ala Arg Arg Gly Asp Gly Ala Asp Pro Glu Gly Glu Gly Val Thr Leu
 35 40 45

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 Gln Arg Asn Ile Thr Leu Ile Asn Gly Val Ala Ile Ile Val Gly Thr

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65	70	75	
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Ala Gly Ser Pro Gly Leu Ser Leu Val Val Trp Ala Val Cys Gly Val			
80	85	90	95
ttc tcc atc gtg ggc gca ctg tgc tac gcg gag ctg ggc act acc atc			396
Phe Ser Ile Val Gly Ala Leu Cys Tyr Ala Glu Leu Gly Thr Thr Ile			
100	105	110	
tca aag tca ggc ggc gac tat gcc tac atg cta gag gtc tac ggc tgc			444
Ser Lys Ser Gly Gly Asp Tyr Ala Tyr Met Leu Glu Val Tyr Gly Ser			
115	120	125	
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Leu Pro Ala Phe Leu Lys Leu Trp Ile Glu Leu Leu Ile Ile Arg Pro			
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Pro Val Phe Pro Thr Cys Pro Val Pro Glu Glu Ala Ala Lys Leu Val			
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260	265	270	
atg atc aac ccc tac agg aac ctc ccc ctg gcc atc atc atc tcc ttg			924
Met Ile Asn Pro Tyr Arg Asn Leu Pro Leu Ala Ile Ile Ile Ser Leu			
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tct 3455

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<212> PRT
<213> Rat

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35 40 45
Arg Asn Ile Thr Leu Ile Asn Gly Val Ala Ile Ile Val Gly Thr Ile
50 55 60
Ile Gly Ser Gly Ile Phe Val Thr Pro Thr Gly Val Leu Lys Glu Ala
65 70 75 80
Gly Ser Pro Gly Leu Ser Leu Val Val Trp Ala Val Cys Gly Val Phe
85 90 95
Ser Ile Val Gly Ala Leu Cys Tyr Ala Glu Leu Gly Thr Thr Ile Ser
100 105 110
Lys Ser Gly Gly Asp Tyr Ala Tyr Met Leu Glu Val Tyr Gly Ser Leu
115 120 125
Pro Ala Phe Leu Lys Leu Trp Ile Glu Leu Leu Ile Ile Arg Pro Ser
130 135 140
Ser Gln Tyr Ile Val Ala Leu Val Phe Ala Thr Tyr Leu Leu Lys Pro
145 150 155 160
Val Phe Pro Thr Cys Pro Val Pro Glu Glu Ala Ala Lys Leu Val Ala
165 170 175
Cys Leu Cys Val Leu Leu Leu Thr Ala Val Asn Cys Tyr Ser Val Lys
180 185 190
Ala Ala Thr Arg Val Gln Asp Ala Phe Ala Ala Ala Lys Leu Leu Ala
195 200 205
Leu Ala Leu Ile Ile Leu Leu Gly Phe Ile Gln Met Gly Lys Asp Ile
210 215 220

Gly	Gln	Gly	Asp	Ala	Ser	Asn	Leu	His	Gln	Lys	Leu	Ser	Phe	Glu	Gly	225	230	235	240
Thr	Asn	Leu	Asp	Val	Gly	Asn	Ile	Val	Leu	Ala	Leu	Tyr	Ser	Gly	Leu	245	250	255	
Phe	Ala	Tyr	Gly	Gly	Trp	Asn	Tyr	Leu	Asn	Phe	Val	Thr	Glu	Glu	Met	260	265	270	
Ile	Asn	Pro	Tyr	Arg	Asn	Leu	Pro	Leu	Ala	Ile	Ile	Ile	Ser	Leu	Pro	275	280	285	
Ile	Val	Thr	Leu	Val	Tyr	Val	Leu	Thr	Asn	Leu	Ala	Tyr	Phe	Thr	Thr	290	295	300	
Leu	Ser	Thr	Asn	Gln	Met	Leu	Thr	Ser	Glu	Ala	Val	Ala	Val	Asp	Phe	305	310	315	320
Gly	Asn	Tyr	His	Leu	Gly	Val	Met	Ser	Trp	Ile	Ile	Pro	Val	Phe	Val	325	330	335	
Gly	Leu	Ser	Cys	Phe	Gly	Ser	Val	Asn	Gly	Ser	Leu	Phe	Thr	Ser	Ser	340	345	350	
Arg	Leu	Phe	Phe	Val	Gly	Ser	Arg	Glu	Gly	His	Leu	Pro	Ser	Ile	Leu	355	360	365	
Ser	Met	Ile	His	Pro	Gln	Leu	Leu	Thr	Pro	Val	Pro	Ser	Leu	Val	Phe	370	375	380	
Thr	Cys	Val	Met	Thr	Leu	Met	Tyr	Ala	Phe	Ser	Arg	Asp	Ile	Phe	Ser	385	390	395	400
Ile	Ile	Asn	Phe	Phe	Ser	Phe	Phe	Asn	Trp	Leu	Cys	Val	Ala	Leu	Ala	405	410	415	
Ile	Ile	Gly	Met	Met	Trp	Leu	Arg	Phe	Lys	Lys	Pro	Glu	Leu	Glu	Arg	420	425	430	
Pro	Ile	Lys	Val	Asn	Leu	Ala	Leu	Pro	Val	Phe	Phe	Ile	Leu	Ala	Cys	435	440	445	
Leu	Phe	Leu	Ile	Ala	Val	Ser	Phe	Trp	Lys	Thr	Pro	Leu	Glu	Cys	Gly	450	455	460	
Ile	Gly	Phe	Ala	Ile	Ile	Leu	Ser	Gly	Leu	Pro	Val	Tyr	Phe	Phe	Gly	465	470	475	480
Val	Trp	Trp	Lys	Asn	Lys	Pro	Lys	Trp	Ile	Leu	Gln	Val	Ile	Phe	Ser	485	490	495	
Val	Thr	Val	Leu	Cys	Gln	Lys	Leu	Met	Gln	Val	Val	Pro	Gln	Glu	Thr	500	505	510	

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<211> 1863

<212> DNA
<213> Homo sapiens

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<222> (110)..(1699)

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<222> (1700)..(1863)

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Met Ser Gln
1

gac acc gag gtg gat atg aag gag gtg gag ctg aat gag tta gag ccc 166
Asp Thr Glu Val Asp Met Lys Glu Val Glu Leu Asn Glu Leu Glu Pro
5 10 15

gag aag cag ccg atg aac gcg gcg tct ggg gcg gcc atg tcc ctg gcg 214
Glu Lys Gln Pro Met Asn Ala Ala Ser Gly Ala Ala Met Ser Leu Ala
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gga gcc gag aag aat ggt ctg gtg aag atc aag gtg gcg gaa gac gag 262
Gly Ala Glu Lys Asn Gly Leu Val Lys Ile Lys Val Ala Glu Asp Glu
40 45 50

gcg gag gcg gca gcc gcg gct aag ttc acg ggc ctg tcc aag gag gag 310
Ala Glu Ala Ala Ala Ala Ala Lys Phe Thr Gly Leu Ser Lys Glu Glu
55 60 65

ctg ctg aag gtg gca ggc agc ccc ggc tgg gta cgc acc cgc tgg gca 358
Leu Leu Lys Val Ala Gly Ser Pro Gly Trp Val Arg Thr Arg Trp Ala
70 75 80

ctg ctg ctg ctc ttc tgg ctc ggc tgg ctc ggc atg ctt gct ggt gcc 406
Leu Leu Leu Leu Phe Trp Leu Gly Trp Leu Gly Met Leu Ala Gly Ala
85 90 95

gtg gtc ata atc gtg cga gcg ccg cgt tgt cgc gag cta ccg gcg cag 454
Val Val Ile Ile Val Arg Ala Pro Arg Cys Arg Glu Leu Pro Ala Gln
100 105 110 115

aag tgg tgg cac acg ggc gcc ctc tac cgc atc ggc gac ctt cag gcc 502
Lys Trp Trp His Thr Gly Ala Leu Tyr Arg Ile Gly Asp Leu Gln Ala
120 125 130

ttc cag ggc cac ggc gcg ggc aac ctg gcg ggt ctg aag ggg cgt ctc 550
Phe Gln Gly His Gly Ala Gly Asn Leu Ala Gly Leu Lys Gly Arg Leu
135 140 145

gat tac ctg agc tct ctg aag gtg aag ggc ctt gtg ctg ggt cca att	598
Asp Tyr Leu Ser Ser Leu Lys Val Lys Gly Leu Val Leu Gly Pro Ile	
150 155 160	
cac aag aac cag aag gat gat gtc gct cag act gac ttg ctg cag atc	646
His Lys Asn Gln Lys Asp Asp Val Ala Gln Thr Asp Leu Leu Gln Ile	
165 170 175	
gac ccc aat ttt ggc tcc aag gaa gat ttt gac agt ctc ttg caa tcg	694
Asp Pro Asn Phe Gly Ser Lys Glu Asp Phe Asp Ser Leu Leu Gln Ser	
180 185 190 195	
gct aaa aaa aag agc atc cgt gtc att ctg gac ctt act ccc aac tac	742
Ala Lys Lys Lys Ser Ile Arg Val Ile Leu Asp Leu Thr Pro Asn Tyr	
200 205 210	
cgg ggt gag aac tcg tgg ttc tcc act cag gtt gac act gtg gcc acc	790
Arg Gly Glu Asn Ser Trp Phe Ser Thr Gln Val Asp Thr Val Ala Thr	
215 220 225	
aag gtg aag gat gct ctg gag ttt tgg ctg caa gct ggc gtg gat ggg	838
Lys Val Lys Asp Ala Leu Glu Phe Trp Leu Gln Ala Gly Val Asp Gly	
230 235 240	
ttc cag gtt cgg gac ata gag aat ctg aag gat gca tcc tca ttc ttg	886
Phe Gln Val Arg Asp Ile Glu Asn Leu Lys Asp Ala Ser Ser Phe Leu	
245 250 255	
gct gag tgg caa aat atc acc aag ggc ttc agt gaa gac agg ctc ttg	934
Ala Glu Trp Gln Asn Ile Thr Lys Gly Phe Ser Glu Asp Arg Leu Leu	
260 265 270 275	
att gcg ggg act aac tcc tcc gac ctt cag cag atc ctg agc cta ctc	982
Ile Ala Gly Thr Asn Ser Ser Asp Leu Gln Gln Ile Leu Ser Leu Leu	
280 285 290	
gaa tcc aac aaa gac ttg ctg ttg act agc tca tac ctg tct gat tct	1030
Glu Ser Asn Lys Asp Leu Leu Leu Thr Ser Ser Tyr Leu Ser Asp Ser	
295 300 305	
ggg tct act ggg gag cat aca aaa tcc cta gtc aca cag tat ttg aat	1078
Gly Ser Thr Gly Glu His Thr Lys Ser Leu Val Thr Gln Tyr Leu Asn	
310 315 320	
gcc act ggc aat cgc tgg tgc agc tgg agt ttg tct cag gca agg ctc	1126
Ala Thr Gly Asn Arg Trp Cys Ser Trp Ser Leu Ser Gln Ala Arg Leu	
325 330 335	
ctg act tcc ttc ttg ccg gct caa ctt ctc cga ctc tac cag ctg atg	1174
Leu Thr Ser Phe Leu Pro Ala Gln Leu Leu Arg Leu Tyr Gln Leu Met	
340 345 350 355	
ctc ttc acc ctg cca ggg acc cct gtt ttc agc tac ggg gat gag att	1222
Leu Phe Thr Leu Pro Gly Thr Pro Val Phe Ser Tyr Gly Asp Glu Ile	
360 365 370	

ggc ctg gat gca gct gcc ctt cct gga cag cct atg gag gct cca gtc 1270
 Gly Leu Asp Ala Ala Ala Leu Pro Gly Gln Pro Met Glu Ala Pro Val
 375 380 385

atg ctg tgg gat gag tcc agc ttc cct gac atc cca ggg gct gta agt 1318
 Met Leu Trp Asp Glu Ser Ser Phe Pro Asp Ile Pro Gly Ala Val Ser
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 Ala Asn Met Thr Val Lys Gly Gln Ser Glu Asp Pro Gly Ser Leu Leu
 405 410 415

tcc ttg ttc cgg cgg ctg agt gac cag cgg agt aag gag cgc tcc cta 1414
 Ser Leu Phe Arg Arg Leu Ser Asp Gln Arg Ser Lys Glu Arg Ser Leu
 420 425 430 435

ctg cat ggg gac ttc cac gcg ttc tcc gct ggg cct gga ctc ttc tcc 1462
 Leu His Gly Asp Phe His Ala Phe Ser Ala Gly Pro Gly Leu Phe Ser
 440 445 450

tat atc cgc cac tgg gac cag aat gag cgt ttt ctg gta gtg ctt aac 1510
 Tyr Ile Arg His Trp Asp Gln Asn Glu Arg Phe Leu Val Val Leu Asn
 455 460 465

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 Phe Gly Asp Val Gly Leu Ser Ala Gly Leu Gln Ala Ser Asp Leu Pro
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gcc agc gcc agc ctc cca gcc aag gct gac ctc ctg ctc agc acc cag 1606
 Ala Ser Ala Ser Leu Pro Ala Lys Ala Asp Leu Leu Leu Ser Thr Gln
 485 490 495

cca ggc cgt gag gag ggc tcc cct ctt gag ctg gaa cgc ctg aaa ctg 1654
 Pro Gly Arg Glu Glu Gly Ser Pro Leu Glu Leu Glu Arg Leu Lys Leu
 500 505 510 515

gag cct cac gaa ggg ctg ctg ctc cgc ttc ccc tac gcg gcc tga 1699
 Glu Pro His Glu Gly Leu Leu Leu Arg Phe Pro Tyr Ala Ala
 520 525 530

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<211> 529

<212> PRT

<213> Homo sapiens

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Glu	Asp	Glu	Ala	Glu	Ala	Ala	Ala	Ala	Ala	Lys	Phe	Thr	Gly	Leu	Ser
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Lys	Glu	Glu	Leu	Leu	Lys	Val	Ala	Gly	Ser	Pro	Gly	Trp	Val	Arg	Thr
65					70					75					80
Arg	Trp	Ala	Leu	Leu	Leu	Leu	Phe	Trp	Leu	Gly	Trp	Leu	Gly	Met	Leu
			85						90					95	
Ala	Gly	Ala	Val	Val	Ile	Ile	Val	Arg	Ala	Pro	Arg	Cys	Arg	Glu	Leu
			100					105					110		
Pro	Ala	Gln	Lys	Trp	Trp	His	Thr	Gly	Ala	Leu	Tyr	Arg	Ile	Gly	Asp
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Leu	Gln	Ala	Phe	Gln	Gly	His	Gly	Ala	Gly	Asn	Leu	Ala	Gly	Leu	Lys
	130					135					140				
Gly	Arg	Leu	Asp	Tyr	Leu	Ser	Ser	Leu	Lys	Val	Lys	Gly	Leu	Val	Leu
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Gly	Pro	Ile	His	Lys	Asn	Gln	Lys	Asp	Asp	Val	Ala	Gln	Thr	Asp	Leu
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Leu	Gln	Ile	Asp	Pro	Asn	Phe	Gly	Ser	Lys	Glu	Asp	Phe	Asp	Ser	Leu
			180					185					190		
Leu	Gln	Ser	Ala	Lys	Lys	Lys	Ser	Ile	Arg	Val	Ile	Leu	Asp	Leu	Thr
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Pro	Asn	Tyr	Arg	Gly	Glu	Asn	Ser	Trp	Phe	Ser	Thr	Gln	Val	Asp	Thr
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Val	Ala	Thr	Lys	Val	Lys	Asp	Ala	Leu	Glu	Phe	Trp	Leu	Gln	Ala	Gly
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Val	Asp	Gly	Phe	Gln	Val	Arg	Asp	Ile	Glu	Asn	Leu	Lys	Asp	Ala	Ser
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Ser	Phe	Leu	Ala	Glu	Trp	Gln	Asn	Ile	Thr	Lys	Gly	Phe	Ser	Glu	Asp
			260					265					270		
Arg	Leu	Leu	Ile	Ala	Gly	Thr	Asn	Ser	Ser	Asp	Leu	Gln	Gln	Ile	Leu
			275				280					285			
Ser	Leu	Leu	Glu	Ser	Asn	Lys	Asp	Leu	Leu	Leu	Thr	Ser	Ser	Tyr	Leu
	290					295					300				
Ser	Asp	Ser	Gly	Ser	Thr	Gly	Glu	His	Thr	Lys	Ser	Leu	Val	Thr	Gln
305					310					315					320
Tyr	Leu	Asn	Ala	Thr	Gly	Asn	Arg	Trp	Cys	Ser	Trp	Ser	Leu	Ser	Gln

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Gln	Leu	Met	Leu	Phe	Thr	Leu	Pro	Gly	Thr	Pro	Val	Phe	Ser	Tyr	Gly	
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Asp	Glu	Ile	Gly	Leu	Asp	Ala	Ala	Ala	Leu	Pro	Gly	Gln	Pro	Met	Glu	
370					375					380						
Ala	Pro	Val	Met	Leu	Trp	Asp	Glu	Ser	Ser	Phe	Pro	Asp	Ile	Pro	Gly	
385					390					395					400	
Ala	Val	Ser	Ala	Asn	Met	Thr	Val	Lys	Gly	Gln	Ser	Glu	Asp	Pro	Gly	
405					410					415						
Ser	Leu	Leu	Ser	Leu	Phe	Arg	Arg	Leu	Ser	Asp	Gln	Arg	Ser	Lys	Glu	
420					425					430						
Arg	Ser	Leu	Leu	His	Gly	Asp	Phe	His	Ala	Phe	Ser	Ala	Gly	Pro	Gly	
435					440					445						
Leu	Phe	Ser	Tyr	Ile	Arg	His	Trp	Asp	Gln	Asn	Glu	Arg	Phe	Leu	Val	
450					455					460						
Val	Leu	Asn	Phe	Gly	Asp	Val	Gly	Leu	Ser	Ala	Gly	Leu	Gln	Ala	Ser	
465					470					475					480	
Asp	Leu	Pro	Ala	Ser	Ala	Ser	Leu	Pro	Ala	Lys	Ala	Asp	Leu	Leu	Leu	
485					490					495						
Ser	Thr	Gln	Pro	Gly	Arg	Glu	Glu	Gly	Ser	Pro	Leu	Glu	Leu	Glu	Arg	
500					505					510						
Leu	Lys	Leu	Glu	Pro	His	Glu	Gly	Leu	Leu	Leu	Arg	Phe	Pro	Tyr	Ala	
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<211> 1797

<212> DNA

<213> Rat

<220>

<221> 5'UTR

<222> (1)..(19)

<220>

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<222> (1604)..(1797)

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Val	Glu	Leu	Asn	Glu	Leu	Glu	Pro	Glu	Lys	Gln	Pro	Met	Asn	Ala	Ala	
			15					20					25			
gac	ggg	gcg	gca	gcc	ggg	gag	aag	aac	ggg	ctg	gtg	aag	att	aag	gtg	148
Asp	Gly	Ala	Ala	Ala	Gly	Glu	Lys	Asn	Gly	Leu	Val	Lys	Ile	Lys	Val	
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gcc	gaa	gac	gag	gcg	gaa	gcc	ggg	gtc	aag	ttc	aca	ggc	tta	tcc	aag	196
Ala	Glu	Asp	Glu	Ala	Glu	Ala	Gly	Val	Lys	Phe	Thr	Gly	Leu	Ser	Lys	
	45					50					55					
gag	gag	cta	ttg	aag	gta	gct	ggc	agc	ccg	ggc	tgg	gtg	cgc	acc	cgc	244
Glu	Glu	Leu	Leu	Lys	Val	Ala	Gly	Ser	Pro	Gly	Trp	Val	Arg	Thr	Arg	
	60				65					70					75	
tgg	gcg	ctg	ctg	ctg	ctc	ttc	tgg	ctc	ggg	tgg	ctg	ggg	atg	ctg	gcg	292
Trp	Ala	Leu	Leu	Leu	Leu	Phe	Trp	Leu	Gly	Trp	Leu	Gly	Met	Leu	Ala	
				80					85				90			
ggc	gcc	gtg	gtt	atc	atc	gtt	cgg	gcg	cca	cgc	tgc	cgt	gag	ctg	ccg	340
Gly	Ala	Val	Val	Ile	Ile	Val	Arg	Ala	Pro	Arg	Cys	Arg	Glu	Leu	Pro	
			95					100					105			
gta	cag	aga	tgg	tgg	cac	aag	ggc	gcc	ctc	tac	cgc	atc	ggc	gac	ctt	388
Val	Gln	Arg	Trp	Trp	His	Lys	Gly	Ala	Leu	Tyr	Arg	Ile	Gly	Asp	Leu	
		110					115					120				
cag	gcc	ttc	gta	ggc	ccg	gaa	gcg	aga	ggc	ata	gct	ggg	ctg	aag	aac	436
Gln	Ala	Phe	Val	Gly	Pro	Glu	Ala	Arg	Gly	Ile	Ala	Gly	Leu	Lys	Asn	
	125					130					135					
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His	Leu	Glu	Tyr	Leu	Ser	Thr	Leu	Lys	Val	Lys	Gly	Leu	Val	Leu	Gly	
	140				145					150				155		
cca	att	cac	aag	aac	cag	aag	gat	gaa	gtc	aat	gaa	acc	gac	ttg	aaa	532
Pro	Ile	His	Lys	Asn	Gln	Lys	Asp	Glu	Val	Asn	Glu	Thr	Asp	Leu	Lys	
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cag	att	gat	ccc	gat	tta	ggc	tcc	cag	gaa	gat	ttt	aaa	gac	ctt	cta	580
Gln	Ile	Asp	Pro	Asp	Leu	Gly	Ser	Gln	Glu	Asp	Phe	Lys	Asp	Leu	Leu	
			175					180					185			
caa	agt	gcc	aag	aaa	aag	agc	att	cac	atc	att	ttg	gac	ctc	act	ccc	628
Gln	Ser	Ala	Lys	Lys	Lys	Ser	Ile	His	Ile	Ile	Leu	Asp	Leu	Thr	Pro	
		190					195					200				
aac	tat	aag	ggc	cag	aat	gca	tgg	ttc	ctc	cct	cct	cag	gct	gac	att	676
Asn	Tyr	Lys	Gly	Gln	Asn	Ala	Trp	Phe	Leu	Pro	Pro	Gln	Ala	Asp	Ile	
	205					210					215					

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Val Ala Thr Lys Met Lys Glu Ala Leu Ser Ser Trp Leu Gln Asp Gly	
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gtg gat ggg ttc caa gtt cgg gat gtg gga aag ctg gcg aat gca tcc	772
Val Asp Gly Phe Gln Val Arg Asp Val Gly Lys Leu Ala Asn Ala Ser	
240 245 250	
ttg tac ttg gct gag tgg cag aat atc acc aag aac ttc agt gag gac	820
Leu Tyr Leu Ala Glu Trp Gln Asn Ile Thr Lys Asn Phe Ser Glu Asp	
255 260 265	
agg ctt ttg att gca ggg acc gcg tcc tct gac ctg caa caa att gtc	868
Arg Leu Leu Ile Ala Gly Thr Ala Ser Ser Asp Leu Gln Gln Ile Val	
270 275 280	
aac ata ctt gaa tcc acc agc gat ctg ctg ctg acc agc tca tac ctg	916
Asn Ile Leu Glu Ser Thr Ser Asp Leu Leu Leu Thr Ser Ser Tyr Leu	
285 290 295	
tca cag ccc gtt ttc act ggg gag cat gca gaa ctc cta gtg att aag	964
Ser Gln Pro Val Phe Thr Gly Glu His Ala Glu Leu Leu Val Ile Lys	
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tat ttg aat gcc act ggc agc cgc tgg tgc agc tgg agt gtg tcg cag	1012
Tyr Leu Asn Ala Thr Gly Ser Arg Trp Cys Ser Trp Ser Val Ser Gln	
320 325 330	
gca gga ctc ctg aca tcc ttt ata ccg gct cag ttt ctc cga ctc tac	1060
Ala Gly Leu Leu Thr Ser Phe Ile Pro Ala Gln Phe Leu Arg Leu Tyr	
335 340 345	
cag ctg ctg ctc ttc act ctg cca gga act cct gtt ttc agc tat ggg	1108
Gln Leu Leu Leu Phe Thr Leu Pro Gly Thr Pro Val Phe Ser Tyr Gly	
350 355 360	
gat gag ctt ggc ctt cag gca gtt gcc ctt cct gga cag cct atg gag	1156
Asp Glu Leu Gly Leu Gln Ala Val Ala Leu Pro Gly Gln Pro Met Glu	
365 370 375	
gct cca ttc atg ctg tgg aat gag tct agc aac tcc caa acc tca agt	1204
Ala Pro Phe Met Leu Trp Asn Glu Ser Ser Asn Ser Gln Thr Ser Ser	
380 385 390 395	
cct gta agc ctc aac atg aca gtg aag ggc caa aat gaa gac ccc ggc	1252
Pro Val Ser Leu Asn Met Thr Val Lys Gly Gln Asn Glu Asp Pro Gly	
400 405 410	
tcc ctc ctc acc cag ttc cgg cga ctg agt gac ctc cgt ggt aag gag	1300
Ser Leu Leu Thr Gln Phe Arg Arg Leu Ser Asp Leu Arg Gly Lys Glu	
415 420 425	
cgc tct ctg tta cac ggt gac ttt gat gca ctg tct tcc tca tct ggg	1348
Arg Ser Leu Leu His Gly Asp Phe Asp Ala Leu Ser Ser Ser Ser Gly	
430 435 440	

ctc ttc tcc tac gtc cgc cac tgg gac cag aat gag cgt tac ctg gtg 1396
 Leu Phe Ser Tyr Val Arg His Trp Asp Gln Asn Glu Arg Tyr Leu Val
 445 450 455

gtg ctc aac ttc cag gat gtg ggc ctg tca gcc agg gta gga gcc tcc 1444
 Val Leu Asn Phe Gln Asp Val Gly Leu Ser Ala Arg Val Gly Ala Ser
 460 465 470 475

aac ctc cct gct ggc ata agc ctg cca gcc agt gct aac ctt ttg ctt 1492
 Asn Leu Pro Ala Gly Ile Ser Leu Pro Ala Ser Ala Asn Leu Leu Leu
 480 485 490

agt act gac agc acc cgg cta agc cgt gag gag ggc acc tcc ctg agc 1540
 Ser Thr Asp Ser Thr Arg Leu Ser Arg Glu Glu Gly Thr Ser Leu Ser
 495 500 505

ctg gaa aac ctg agc ctg aat cct tat gag ggc ttg ttg tta cag ttc 1588
 Leu Glu Asn Leu Ser Leu Asn Pro Tyr Glu Gly Leu Leu Leu Gln Phe
 510 515 520

cct ttt gtg gcc tga tccctctaca cagaacctgc cacccttctt tcctctctca 1643
 Pro Phe Val Ala
 525

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aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaa 1797

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 <213> Rat

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 35 40 45

Glu Ala Gly Val Lys Phe Thr Gly Leu Ser Lys Glu Glu Leu Leu Lys
 50 55 60

Val Ala Gly Ser Pro Gly Trp Val Arg Thr Arg Trp Ala Leu Leu Leu
 65 70 75 80

Leu Phe Trp Leu Gly Trp Leu Gly Met Leu Ala Gly Ala Val Val Ile
 85 90 95

Ile Val Arg Ala Pro Arg Cys Arg Glu Leu Pro Val Gln Arg Trp Trp
 100 105 110

His Lys Gly Ala Leu Tyr Arg Ile Gly Asp Leu Gln Ala Phe Val Gly
 115 120 125
 Pro Glu Ala Arg Gly Ile Ala Gly Leu Lys Asn His Leu Glu Tyr Leu
 130 135 140
 Ser Thr Leu Lys Val Lys Gly Leu Val Leu Gly Pro Ile His Lys Asn
 145 150 155 160
 Gln Lys Asp Glu Val Asn Glu Thr Asp Leu Lys Gln Ile Asp Pro Asp
 165 170 175
 Leu Gly Ser Gln Glu Asp Phe Lys Asp Leu Leu Gln Ser Ala Lys Lys
 180 185 190
 Lys Ser Ile His Ile Ile Leu Asp Leu Thr Pro Asn Tyr Lys Gly Gln
 195 200 205
 Asn Ala Trp Phe Leu Pro Pro Gln Ala Asp Ile Val Ala Thr Lys Met
 210 215 220
 Lys Glu Ala Leu Ser Ser Trp Leu Gln Asp Gly Val Asp Gly Phe Gln
 225 230 235 240
 Val Arg Asp Val Gly Lys Leu Ala Asn Ala Ser Leu Tyr Leu Ala Glu
 245 250 255
 Trp Gln Asn Ile Thr Lys Asn Phe Ser Glu Asp Arg Leu Leu Ile Ala
 260 265 270
 Gly Thr Ala Ser Ser Asp Leu Gln Gln Ile Val Asn Ile Leu Glu Ser
 275 280 285
 Thr Ser Asp Leu Leu Leu Thr Ser Ser Tyr Leu Ser Gln Pro Val Phe
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 Thr Gly Glu His Ala Glu Leu Leu Val Ile Lys Tyr Leu Asn Ala Thr
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 Gly Ser Arg Trp Cys Ser Trp Ser Val Ser Gln Ala Gly Leu Leu Thr
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 Thr Leu Pro Gly Thr Pro Val Phe Ser Tyr Gly Asp Glu Leu Gly Leu
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 385 390 395 400
 Met Thr Val Lys Gly Gln Asn Glu Asp Pro Gly Ser Leu Leu Thr Gln
 405 410 415

Phe Arg Arg Leu Ser Asp Leu Arg Gly Lys Glu Arg Ser Leu Leu His
420 425 430

Gly Asp Phe Asp Ala Leu Ser Ser Ser Ser Gly Leu Phe Ser Tyr Val
435 440 445

Arg His Trp Asp Gln Asn Glu Arg Tyr Leu Val Val Leu Asn Phe Gln
450 455 460

Asp Val Gly Leu Ser Ala Arg Val Gly Ala Ser Asn Leu Pro Ala Gly
465 470 475 480

Ile Ser Leu Pro Ala Ser Ala Asn Leu Leu Leu Ser Thr Asp Ser Thr
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<220>

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synthesized primer sequence

<220>

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<222> (1)..(22)

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22

<210> 10

<211> 22

<212> DNA

<213> Artificial Sequence

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<222> (1)..(22)

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22

<210> 11
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<220>
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<400> 11
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<210> 15

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<222> (1)..(24)

<400> 15

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24

<210> 16

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<212> DNA

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<400> 18
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<220>
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synthesized primer sequence

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<400> 21
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<210> 22
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synthesized primer sequence

<220>
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<400> 22
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21

<210> 23
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synthesized primer sequence

<220>
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<222> (1)..(22)

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synthesized primer sequence

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<400> 25
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<210> 26
<211> 1524
<212> RNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(1524)

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gag gag aag gaa gag gcg cgg gag aag aug cug gcc gcc aag agc gcg 96
Glu Glu Lys Glu Glu Ala Arg Glu Lys Met Leu Ala Ala Lys Ser Ala
      20             25             30

gac ggc ucg gcg ccg gca ggc gag ggc gag ggc gug acc cug cag cgg 144
Asp Gly Ser Ala Pro Ala Gly Glu Gly Glu Gly Val Thr Leu Gln Arg
      35             40             45

aac auc acg cug cuc aac ggc gug gcc auc auc gug ggg acc auu auc 192
Asn Ile Thr Leu Leu Asn Gly Val Ala Ile Ile Val Gly Thr Ile Ile
      50             55             60

ggc ucg ggc auc uuc gug acg ccc acg ggc gug cuc aag gag gca ggc 240
Gly Ser Gly Ile Phe Val Thr Pro Thr Gly Val Leu Lys Glu Ala Gly
      65             70             75             80

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ucg ccg ggg cug gcg cug gug gug ugg gcc gcg ugc ggc guc uuc ucc	288
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auc gug ggc gcg cuc ugc uac gcg gag cuc ggc acc acc auc ucc aaa	336
Ile Val Gly Ala Leu Cys Tyr Ala Glu Leu Gly Thr Thr Ile Ser Lys	
100 105 110	
ucg ggc ggc gac uac gcc uac aug cug gag guc uac ggc ucg cug ccc	384
Ser Gly Gly Asp Tyr Ala Tyr Met Leu Glu Val Tyr Gly Ser Leu Pro	
115 120 125	
gcc uuc cuc aag cuc ugg auc gag cug cuc auc auc cgg ccu uca ucg	432
Ala Phe Leu Lys Leu Trp Ile Glu Leu Leu Ile Ile Arg Pro Ser Ser	
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cag uac auc gug gcc cug guc uuc gcc acc uac cug cuc aag ccg cuc	480
Gln Tyr Ile Val Ala Leu Val Phe Ala Thr Tyr Leu Leu Lys Pro Leu	
145 150 155 160	
uuc ccc acc ugc ccg gug ccc gag gag gca gcc aag cuc gug gcc ugc	528
Phe Pro Thr Cys Pro Val Pro Glu Glu Ala Ala Lys Leu Val Ala Cys	
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Leu Cys Val Leu Leu Thr Ala Val Asn Cys Tyr Ser Val Lys Ala	
180 185 190	
gcc acc cgg guc cag gau gcc uuu gcc gcc gcc aag cuc cug gcc cug	624
Ala Thr Arg Val Gln Xaa Ala Phe Ala Ala Ala Lys Leu Leu Ala Leu	
195 200 205	
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ucc aaU cua gau ccc aac uuc uca uuu gaa ggc acc aaa cug gau gug	720
Ser Asn Leu Xaa Pro Asn Phe Ser Phe Glu Gly Thr Lys Leu Xaa Val	
225 230 235 240	
ggg aac auu gug cug gca uua uac agc ggc cuc uuu gcc uau gga gga	768
Gly Asn Ile Val Leu Ala Leu Tyr Ser Gly Leu Phe Ala Tyr Gly Gly	
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Trp Asn Tyr Leu Asn Phe Val Thr Glu Glu Met Ile Asn Pro Tyr Arg	
260 265 270	
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Asn Leu Pro Leu Ala Ile Ile Ile Ser Leu Pro Ile Val Thr Leu Val	
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Tyr Val Leu Thr Asn Leu Ala Tyr Phe Thr Thr Leu Ser Thr Glu Gln	
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Gly	Val	Met	Ser	Trp	Ile	Ile	Pro	Val	Phe	Val	Gly	Leu	Ser	Cys	Phe	
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Gly	Ser	Val	Asn	Gly	Ser	Leu	Phe	Thr	Ser	Ser	Arg	Leu	Phe	Phe	Val	
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Gly	Ser	Arg	Glu	Gly	His	Leu	Pro	Ser	Ile	Leu	Ser	Met	Ile	His	Pro	
		355					360					365				
cag	cuc	cuc	acc	ccc	gug	ccg	ucc	cuc	gug	uuc	acg	ugu	gug	aug	acg	1152
Gln	Leu	Leu	Thr	Pro	Val	Pro	Ser	Leu	Val	Phe	Thr	Cys	Val	Met	Thr	
	370					375					380					
cug	cuc	uac	gcc	uuc	ucc	aag	gac	auc	uuc	ucc	guc	auc	aac	uuc	uuc	1200
Leu	Leu	Tyr	Ala	Phe	Ser	Lys	Asp	Ile	Phe	Ser	Val	Ile	Asn	Phe	Phe	
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agc	uuc	uuc	aac	ugg	cuc	ugc	gug	gcc	cug	gcc	auc	auc	ggc	aug	auc	1248
Ser	Phe	Phe	Asn	Trp	Leu	Cys	Val	Ala	Leu	Ala	Ile	Ile	Gly	Met	Ile	
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Trp	Leu	Arg	His	Arg	Lys	Pro	Glu	Leu	Glu	Arg	Pro	Ile	Lys	Val	Asn	
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cug	gcc	cug	ccu	gug	uuc	uuc	auc	cug	gcc	ugc	cuc	uuc	cug	auc	gcc	1344
Leu	Ala	Leu	Pro	Val	Phe	Phe	Ile	Leu	Ala	Cys	Leu	Phe	Leu	Ile	Ala	
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guc	ucc	uuc	ugg	aag	aca	ccc	gug	gag	ugu	ggc	auc	ggc	uuc	acc	auc	1392
Val	Ser	Phe	Trp	Lys	Thr	Pro	Val	Glu	Cys	Gly	Ile	Gly	Phe	Thr	Ile	
	450					455					460					
auc	cuc	agc	ggg	cug	ccc	guc	uac	uuc	uuc	ggg	guc	ugg	ugg	aaa	aac	1440
Ile	Leu	Ser	Gly	Leu	Pro	Val	Tyr	Phe	Phe	Gly	Val	Trp	Trp	Lys	Asn	
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Lys	Pro	Lys	Trp	Leu	Leu	Gln	Gly	Ile	Phe	Ser	Thr	Thr	Val	Leu	Cys	
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cag	aag	cuc	aug	cag	gug	guc	ccc	cag	gag	aca	uag					1524
Gln	Lys	Leu	Met	Gln	Val	Val	Pro	Gln	Glu	Thr						
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<210> 27

<211> 1590

<212> RNA

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<222> (1)..(1590)

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Leu Glu Pro Glu Lys Gln Pro Met Asn Ala Ala Ser Gly Ala Ala Met	
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ucc cug gcg gga gcc gag aag aaU ggu cug gug aag auc aag gug gcg	144
Ser Leu Ala Gly Ala Glu Lys Asn Gly Leu Val Lys Ile Lys Val Ala	
35 40 45	
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Glu Asp Glu Ala Glu Ala Ala Ala Ala Lys Phe Thr Gly Leu Ser	
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Lys Glu Glu Leu Leu Lys Val Ala Gly Ser Pro Gly Trp Val Arg Thr	
65 70 75 80	
cgc ugg gca cug cug cug cuc uuc ugg cuc ggc ugg cuc ggc aug cuu	288
Arg Trp Ala Leu Leu Leu Leu Phe Trp Leu Gly Trp Leu Gly Met Leu	
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Ala Gly Ala Val Val Ile Ile Val Arg Ala Pro Arg Cys Arg Glu Leu	
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Pro Ala Gln Lys Trp Trp His Thr Gly Ala Leu Tyr Arg Ile Gly Asp	
115 120 125	
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Leu Gln Ala Phe Gln Gly His Gly Ala Gly Asn Leu Ala Gly Leu Lys	
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Gly Pro Ile His Lys Asn Gln Lys Xaa Xaa Val Ala Gln Xaa Asp Leu	
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Leu Gln Ser Ala Lys Lys Lys Ser Ile Arg Val Ile Leu Asp Leu Xaa	
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Arg Leu Leu Ile Ala Gly Xaa Asn Ser Ser Asp Leu Gln Gln Ile Leu	
275 280 285	
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Ser Leu Leu Glu Ser Asn Lys Asp Leu Leu Leu Xaa Ser Ser Tyr Leu	
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Ser Xaa Ser Gly Ser Xaa Gly Glu His Thr Lys Ser Leu Val Thr Gln	
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Tyr Leu Asn Ala Xaa Gly Asn Arg Trp Cys Ser Trp Ser Leu Ser Gln	
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Ala Arg Leu Leu Xaa Ser Phe Leu Pro Ala Gln Leu Leu Arg Leu Tyr	
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Gln Leu Met Leu Phe Thr Leu Pro Gly Thr Pro Val Phe Ser Tyr Gly	
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Xaa Glu Ile Gly Leu Xaa Ala Ala Ala Leu Pro Gly Gln Pro Met Glu	
370 375 380	
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Ala Val Ser Ala Asn Met Xaa Val Lys Gly Gln Ser Glu Asp Pro Gly	
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